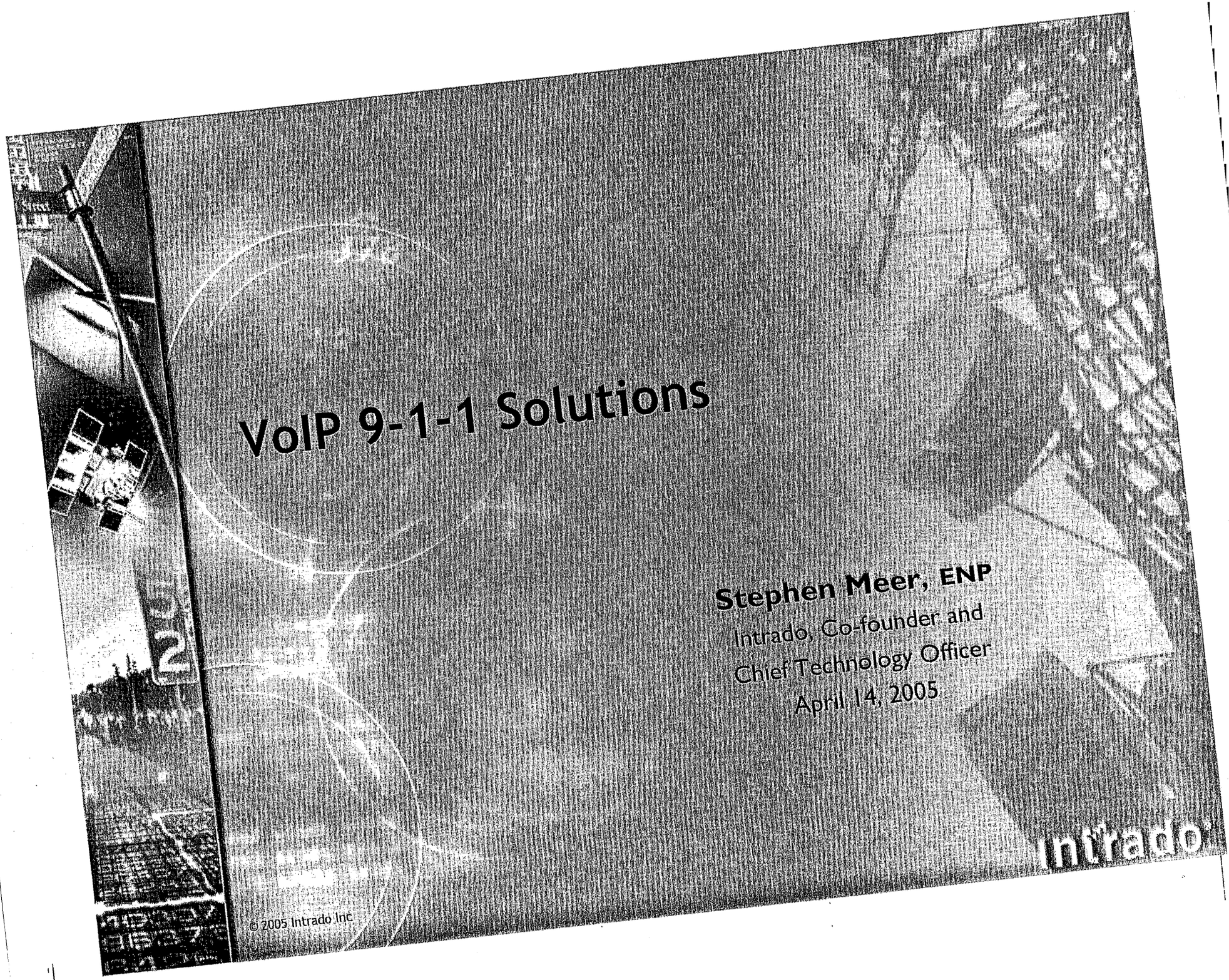
VoIP 9-1-1 Solutions
Stephen Meer, ENP
Intrado, Co-founder and
Chief Technology Officer
April 14, 2005
Intrado
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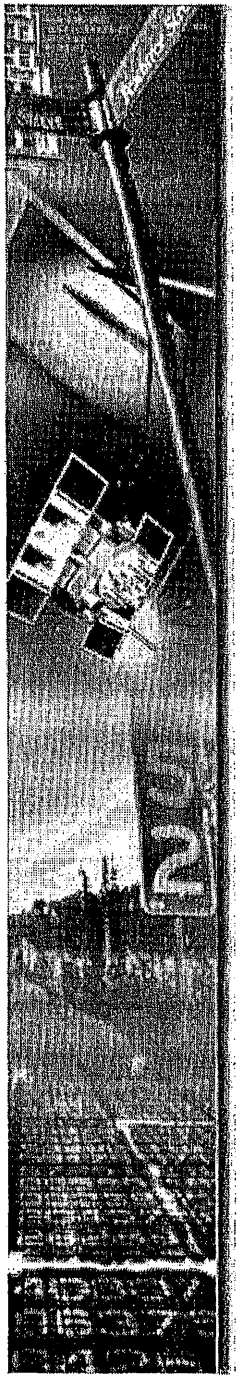

About Intrado

General

- Founded in 1979
- Headquartered in Longmont, CO and offices located in Lisle, IL, Austin, TX and Zug Switzerland
- 700+ employees
- NASDAQ: TRDO

The largest public safety systems provider in North America

- 11 ILECs – 206 million records
- 37 major CLECs – 9.8 million subscribers
- Over 40 wireless carriers – 81 million subscribers
- 800+ municipalities and government agencies using Intrado's 9-1-1 and notification software and services
- Strong relationships with over 7,700 PSAPs

This broad involvement gives us a unique perspective and visibility to operational and technical issues not recognized by others

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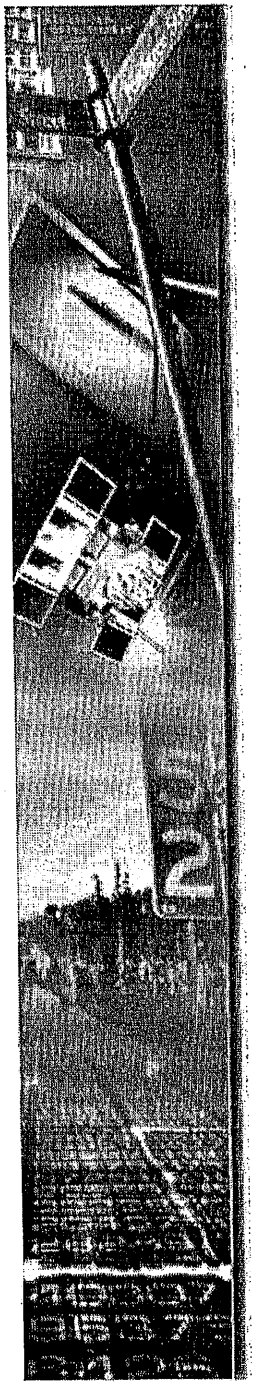
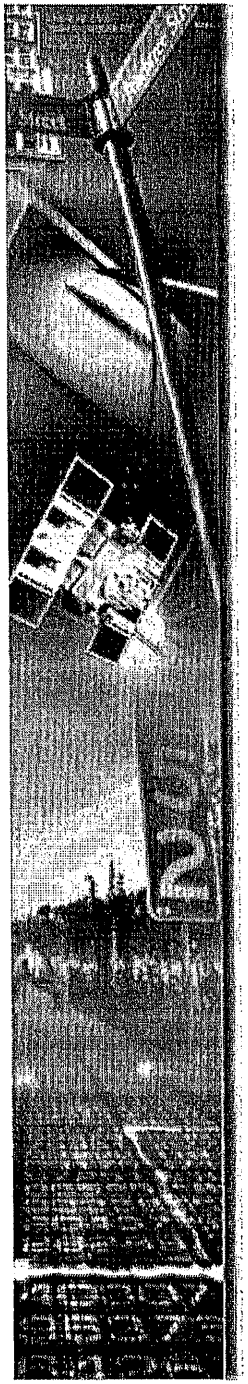


Roles of Legacy E9-1-1 Participants

- 9-1-1 Service Provider (typically ILEC)
  - Maintain MSAG
  - Manage data infrastructure for subscriber info
  - Provide Selective Routing
  - Deliver calls with ANI and ALI to PSAP
- Dial-Tone Providers (ILEC and CLEC)
  - Provide customer TN information to NSP
  - Interconnect with NSP to pass call traffic
  - Wireless: Provide real-time location information
- Public Safety Answering Point
  - Select level of desired 9-1-1 service
  - Provide information regarding service area
  - Answer calls
  - Pay 9-1-1 Service Provider
  - In some cases pay DTPs



Traditional E9-1-1 Service Elements

- Automatic Number Identification (ANI)
- Automatic Location Identification (ALI)
- Selective Routing (SR)

All based on the original notion that a telephone number denotes both "who" and "where". This no longer applies when mobility or IP enters the picture.

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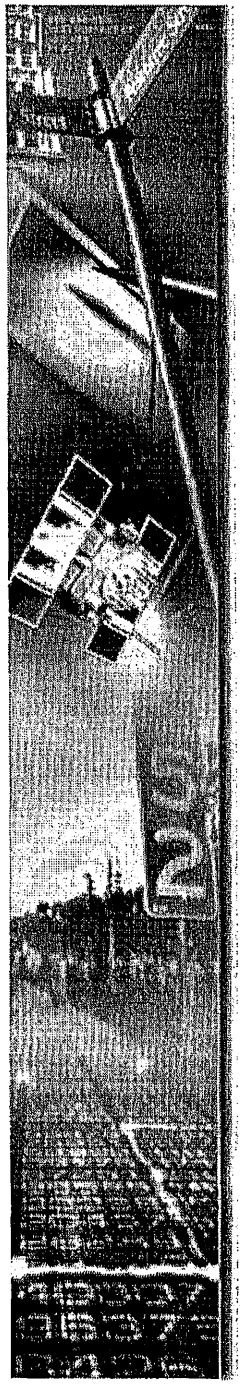
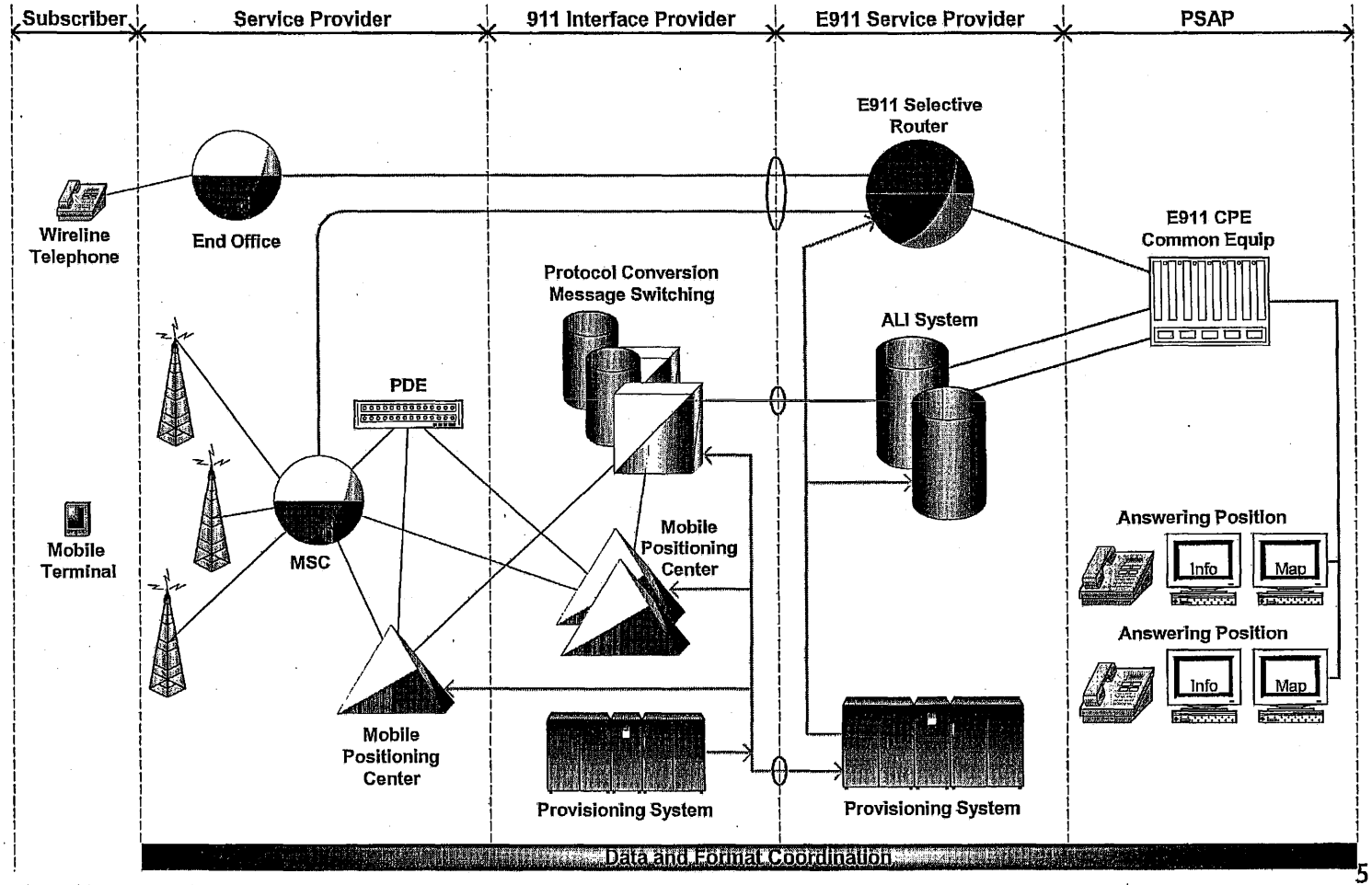


Pre-VoIP E9-1-1 in the USA



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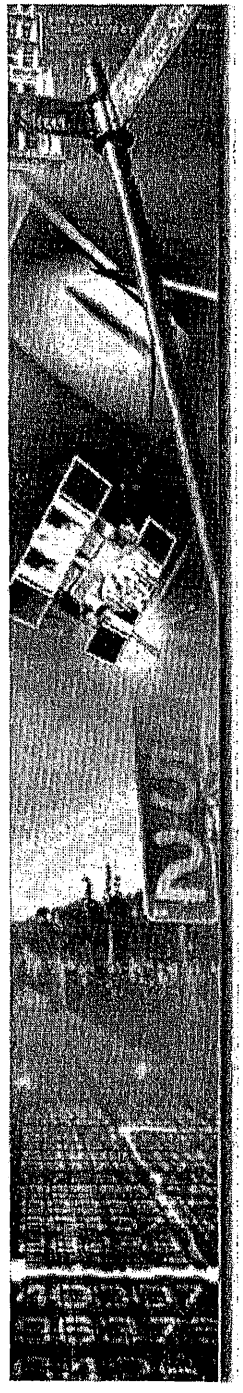
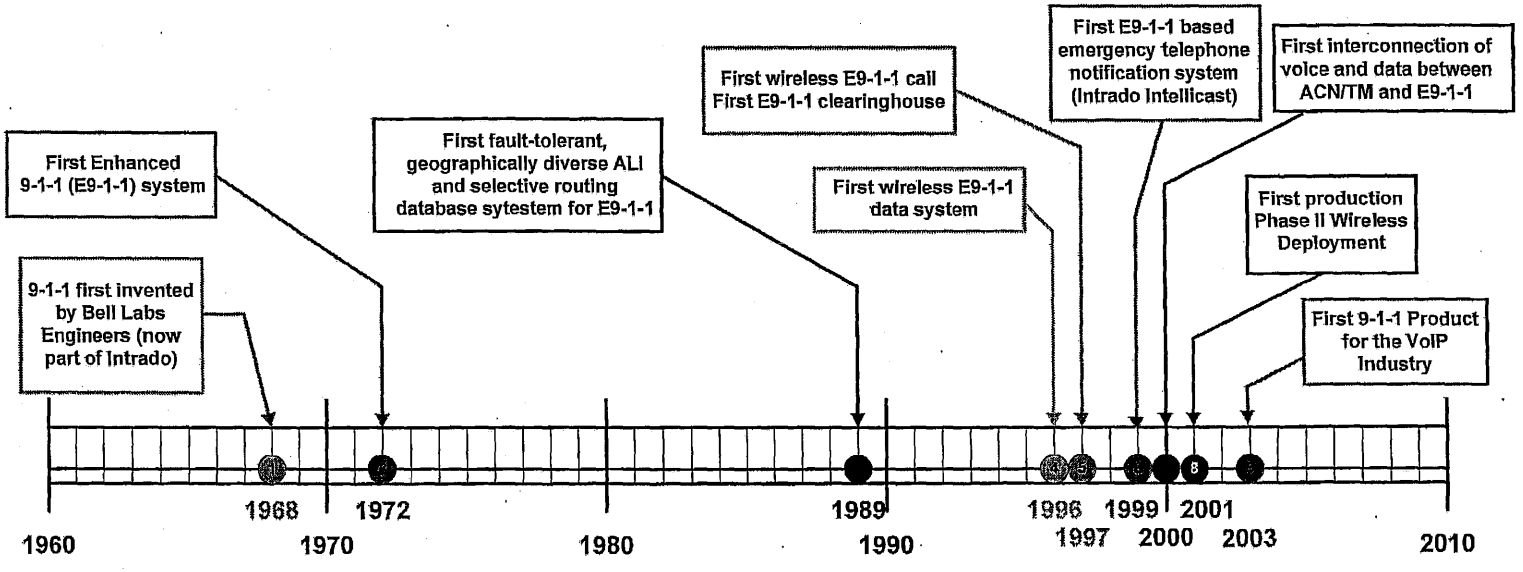


E9-1-1 Change and Expansion



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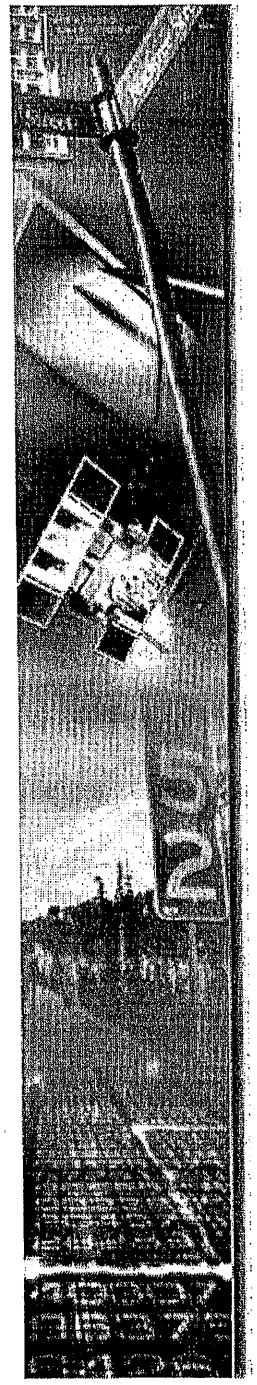
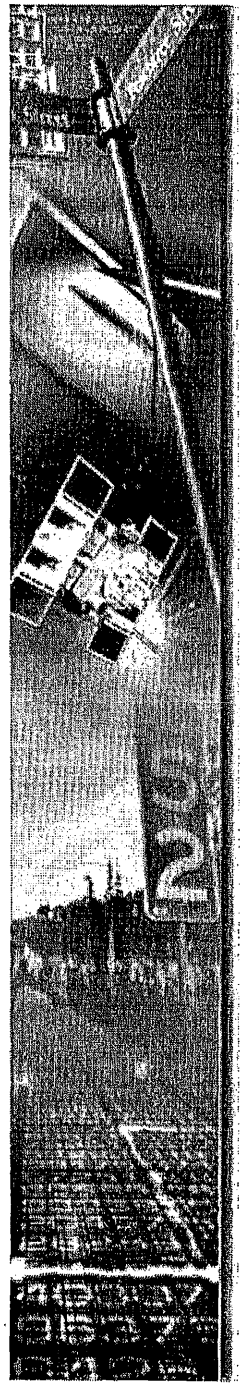
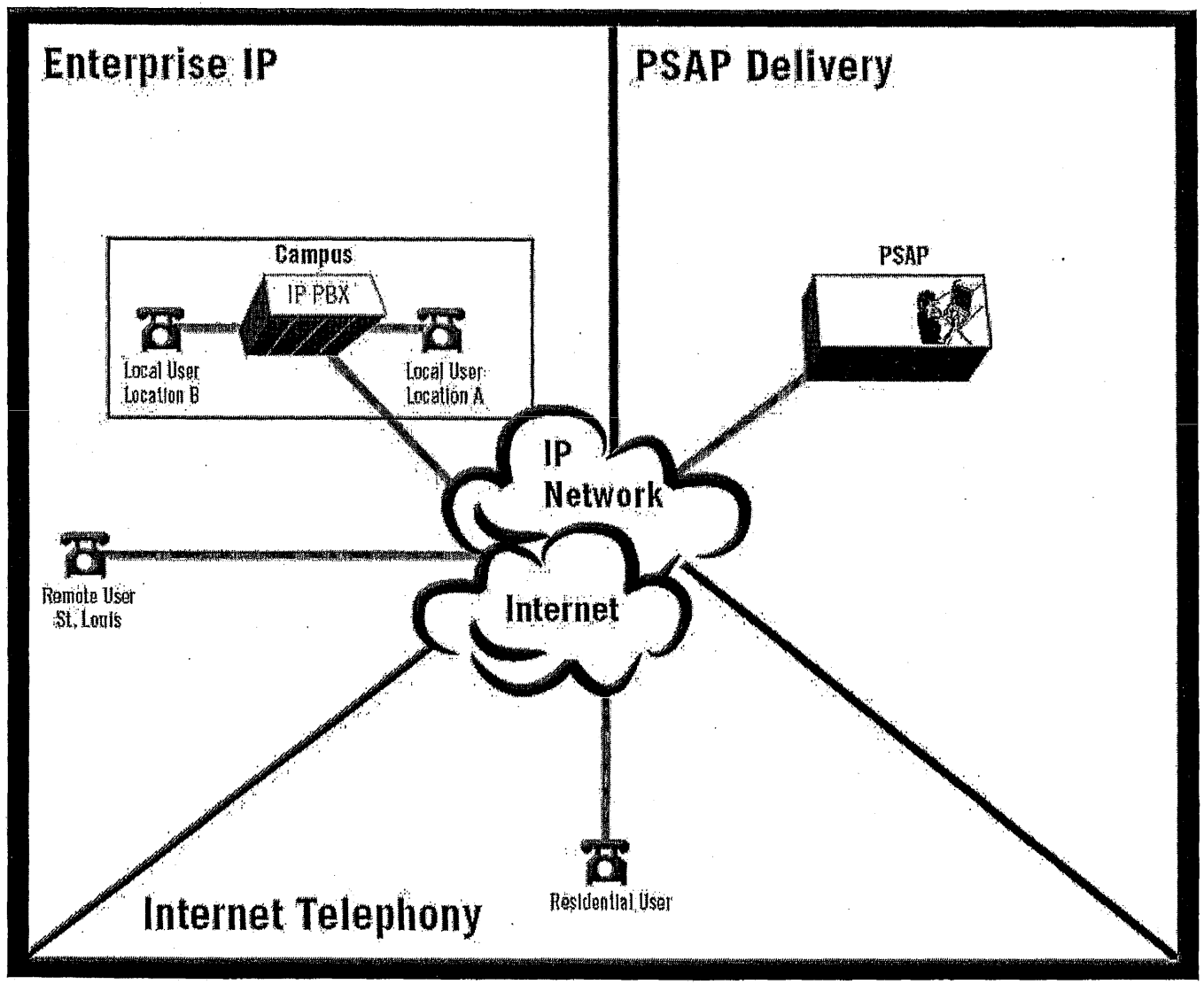


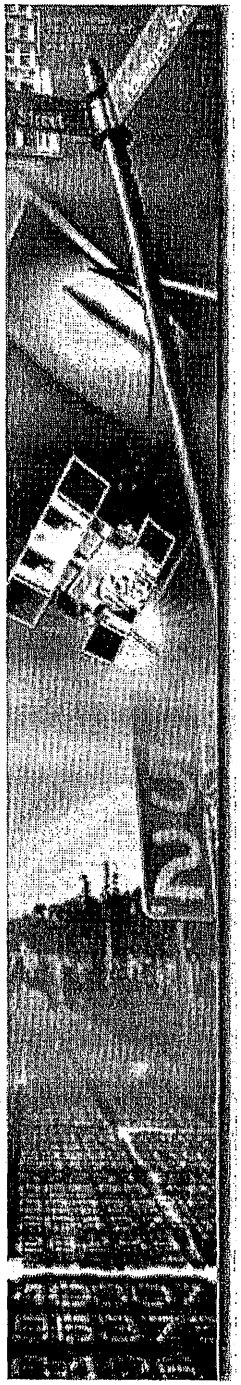
Change Capacity Challenged

- Fundamental infrastructure has been adapted serially for each new insult that arises
- Time to implement change is now longer than interval before next challenge arises
- Interval costs are significant
- Technical, regulatory and funding aspects all contribute to change capacity challenge



VoIP AND 9-1-1





Phased 9-1-1 IP Technology

NENA Three Phase Plan

- I1 VoIP 9-1-1 calls delivered to PSAP on a 10 digit line with no 9-1-1 features
- I2 VoIP 9-1-1 calls delivered to the PSAP via the Selective Router with 9-1-1 features
- I3 E9-1-1 infrastructure migrates fully to IP and all circuit switched elements are retired

None of these phases specifically targets the issue of automatic location determination of mobile devices

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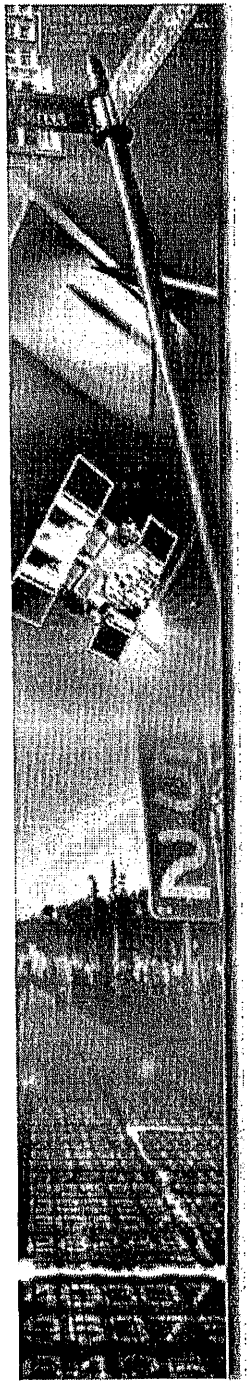

Solutions Operational Today

- 11 delivery to PSAP via designated 10 digit lines based on registered location of caller
- 11 delivery to PSAP via designated 10 digit lines based on caller manually on-line updating a new location
- 12 delivery to PSAPs via SR and E9-1-1 trunks to PSAP with ALI based on registered location of caller
- 12 delivery to PSAP via SR and E9-1-1 trunks to PSAP with ALI for manually on-line updating a new location

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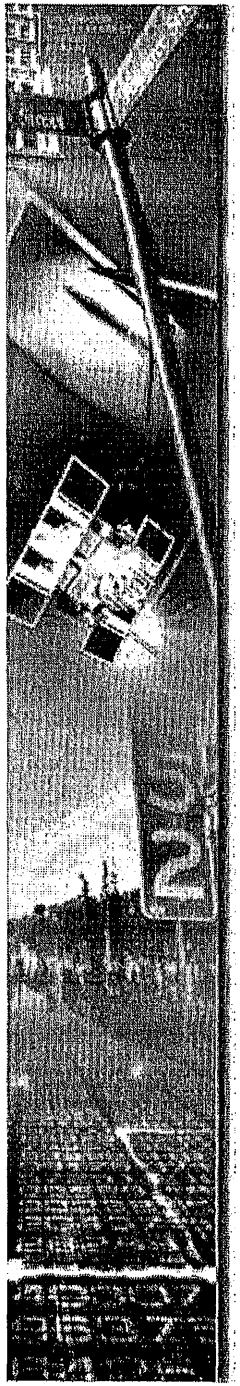

Multiple Demonstrated I2 Methods

- IP to circuit switched gateway between VSP and ILEC SR. Multiple configurations depending on owner of gateway
- PSTN access to "supply" side of SR with translations loaded into SR that place call on existing 9-1-1 trunks to PSAP

All I2 methods involve access to the SR for voice traffic as well as access to the 9-1-1 data provisioning system and ALI system for provisioning of static records or real-time ALI interconnection to allow for steering of ALI request to VSP database

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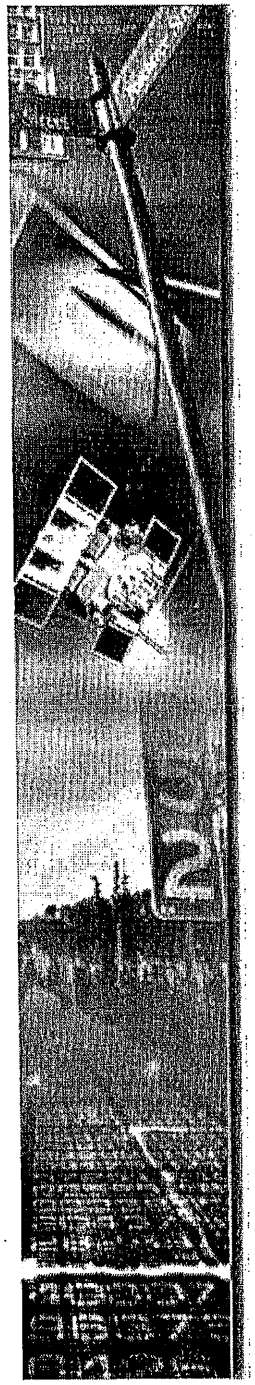
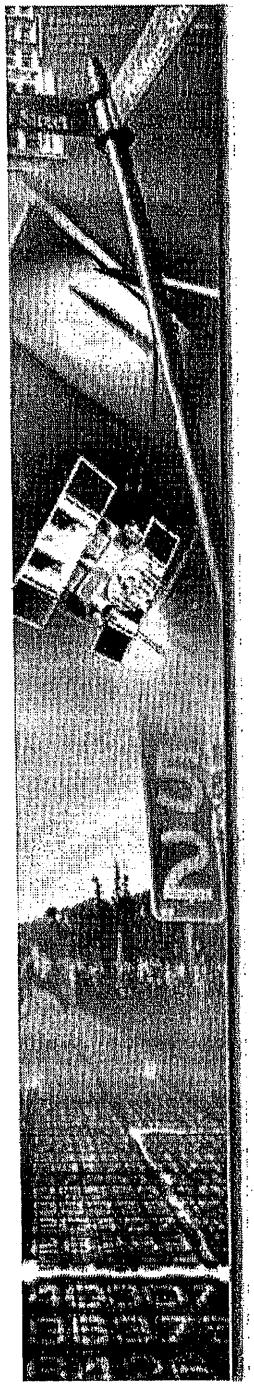


13 Work in Progress

- North America meets the world
- In our opinion, not enough discussion about Public Safety critical success requirements
- Large scale system operational realities have yet to enter into the discussion
- Multiple groups addressing individual aspects of the end state solution
- Transition strategy needs definition and rationalization

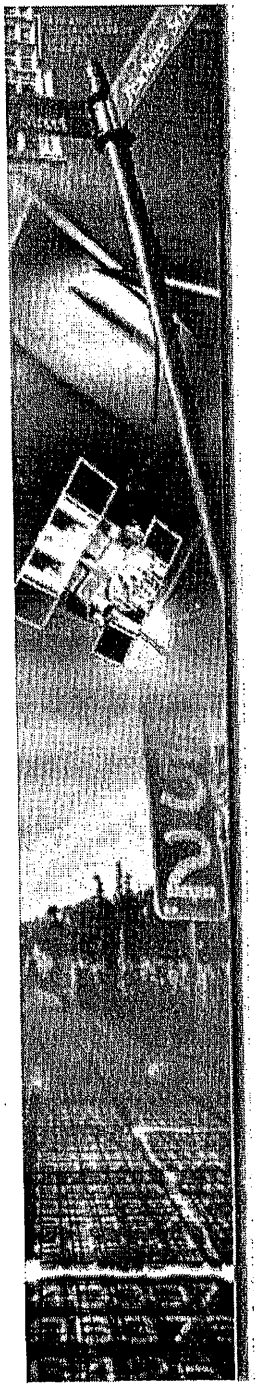


VoIP Location Determination

- Like wireless - likely many mechanisms
  - Suggests needs for standard interfaces and operational requirements
- Current thoughts are that "access provider" will be responsible for location determination, not the application provider
- Many of the proposed schemes rely on large numbers of coordinated participant systems that are operated by disparate groups
  - Not based on real-world 9-1-1 experience
- Much concern about "autopilot" notion of devices self-reporting
  - Misconception about concept of "intelligence at the edge"
  - Inability to manage and concern of "spoofing"

Location Determination Mechanisms

- Access jack inventory
- Wireless access point inventory
- DNS level resolution
- Access point mapping/triangulation
- HDTV signal triangulation
- GPS - all derivatives
- Hybrid

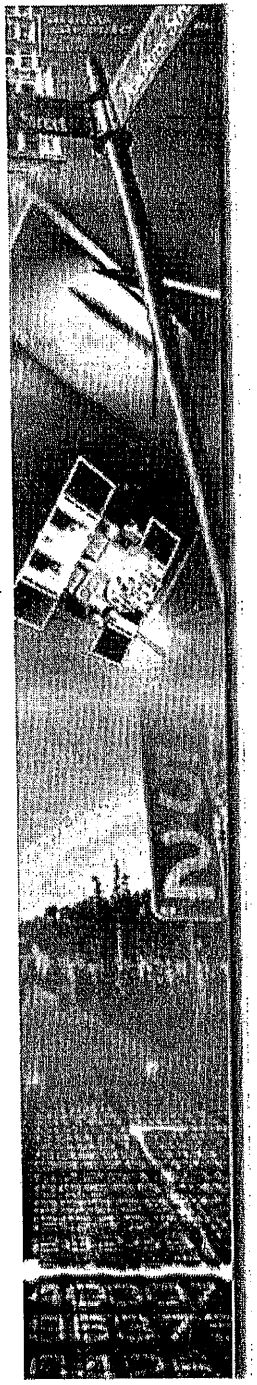


Realities

- VoIP providers not currently regulated or "certificated"
  - NSP Interconnection challenges
  - Access to boundary data (MSAG)
  - Best practices dramatically vary
- Traditional 9-1-1 elements not present
  - Separate Access and Service Provider
  - Service Provider could be anywhere in world
  - Foreign telephone numbers (NPA) often used
  - Legacy trunking models not available
  - User mobility
  - Network currently unable to determine user location
  - Security challenges
- New Players
  - Internet Engineering Task Force (IETF)
  - Traditional 9-1-1 system operators currently not well represented

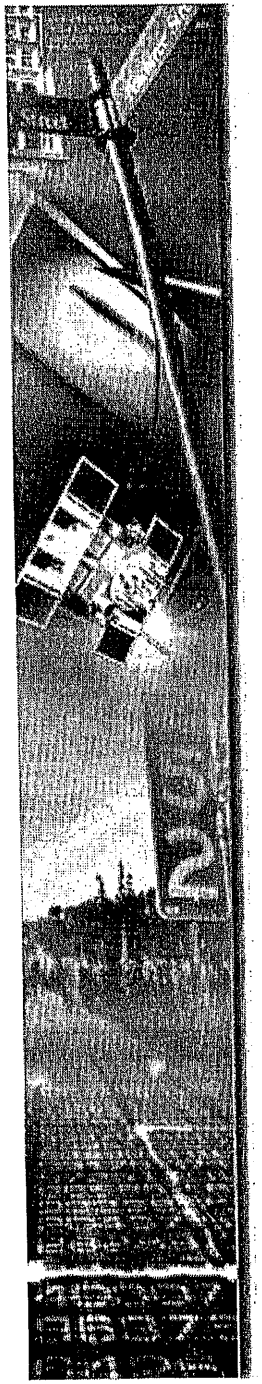
Things to Consider

- Effective 9-1-1 is all about details and precision.
- FUD about PSAP 10 digit designated emergency lines versus "administrative" lines.
- Cost centers associated with providing 9-1-1 service change dramatically based on the addition of mobility and the ever growing number of providers that serve an area.
- We don't believe that costs of operating the 9-1-1 infrastructure will decrease with a movement to pervasive IP technology. Certainly cost elements will change and most importantly additional valuable service features will be enabled.
- It is not realistic or operationally sound to expect that PSAPs will have a contractual or operational relationship directly with each VSP.



Things to Consider (cont.)

- We should not forget 30 years of hard learned lessons and best practices as we move forward to IP.
- In reality, VoIP is just the current "next thing", others are looming and one important aspect of this discussion is to determine to what extent futures beyond VoIP should be considered in this round.
- Long term 9-1-1 system efficacy depends on a workable and sustainable business model.

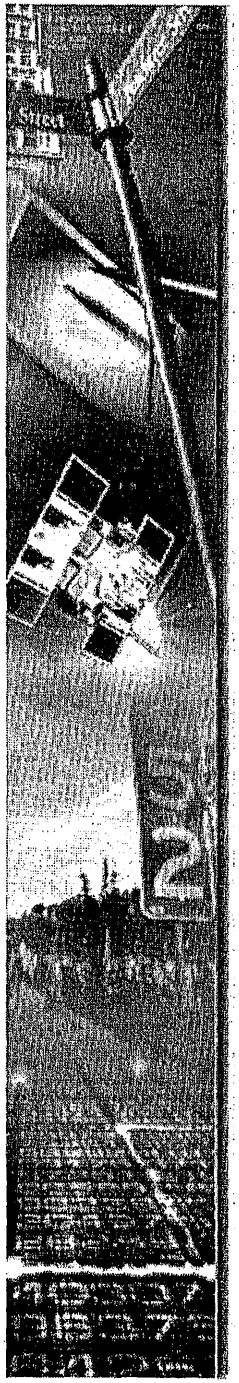


VoIP 9-1-1 Challenges

- Access to existing E9-1-1 environment
  - Voice path
  - Provisioning
  - Real-time information
- Mobility
  - Location determination mechanism
  - Accuracy
  - Testing/certification
- Business matters
  - Liability protection
  - Participation in E9-1-1 service fees
  - Cost recovery applicability

Moving Forward - Policy Considerations

- Removing artificial barriers
  - Access to the Selective Routers and ALI Steering for VoIP Service Providers; despite recent ILEC movement.
  - Ensure third party concentrators of VoIP traffic are included.
  - Defer to existing standards organizations for technical recommendations and solutions
- Government's role
  - Establish the definition of a VoIP provider and require them to comply with 9-1-1 policy and service level mandates of each State.
  - Ensure that providers are treated essentially the same within the States as traditional telecommunications carriers and includes eligibility for cost recovery
  - Plan for long term solutions
- Liability
  - Provide for same liability protection afforded wireless carriers pursuant to 47 U.S.C. §615a.



Discussion

White papers, industry documents and other reference materials available at:

www.intrado.com

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